
BULLETIN

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Cover: A pair of young, captive-bred Atlantic bushmasters, *Lachesis muta rhombeata*, in their outdoor enclosure at the Serra Grande Center for *Lachesis muta* Breeding, Itacaré, Bahia, Brazil. Photograph by Fabio Coppola.

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Endurance

Rod Souza

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Consistently producing babies is the only way to prove the efficiency of an alternative method for captive breeding an extremely sensitive species like the Atlantic bushmaster, *Lachesis muta rhombeata*. According to Zamudio and Greene (1997), “the Atlantic bushmaster will continue to be recognized as a subspecies by those who feel that category fills a useful role in systematics.” I include myself among those few.

In my 2006 paper [Concerning *Lachesis* and Capoeira, Bull. Chicago Herp. Soc. 41(4):65-68] I stated that at that time, my breeding program was a complete failure, but that accumulated knowledge would soon lead to our first positive results.

My 2007 paper [Reproduction of the Atlantic Bushmaster (*Lachesis muta rhombeata*) for the First Time in Captivity, Bull. Chicago Herp. Soc. 42(3):41-43] shows how we managed to achieve success. But would we be able to repeat it in those low-tech chicken houses within the jungle, where parasite control

seemed impossible?

The answer is yes, and in a 2008 paper with Dr. Earl Turner and Rob Carmichael [Dialogues on the Tao of *Lachesis*, Bull. Chicago Herp. Soc. 43(10):157-164] my “primitive herpeto-culture” was presented in detail. That’s the path that led to the images we intend to share now, concluding the process of proving a method: 32 babies in 2009.

Again, the forest provided all elements for the incubation period. Temperature, humidity, light—everything was natural. At 24–25°C we may have recorded the longest period of time from egg laying to pipping for the genus *Lachesis*: 92 days.

To me, it’s at miracle level to even think of an egg surviving for three months in the jungle. That alone would be enough trouble for the species, but let’s also remember the 93% habitat destruction.



It took some endurance to stick to our own beliefs amidst so much prejudice and doubt, but in the end, it was worth it.

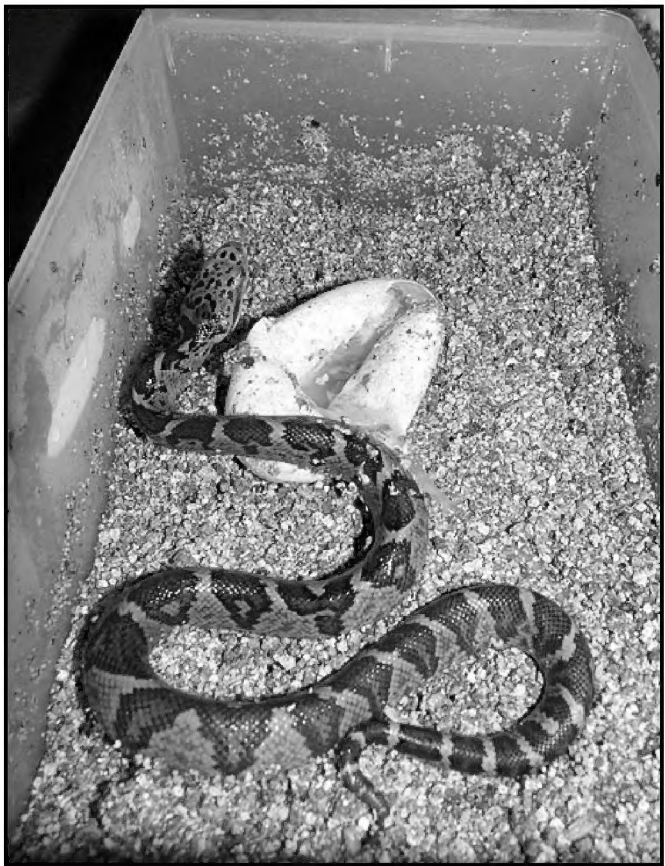
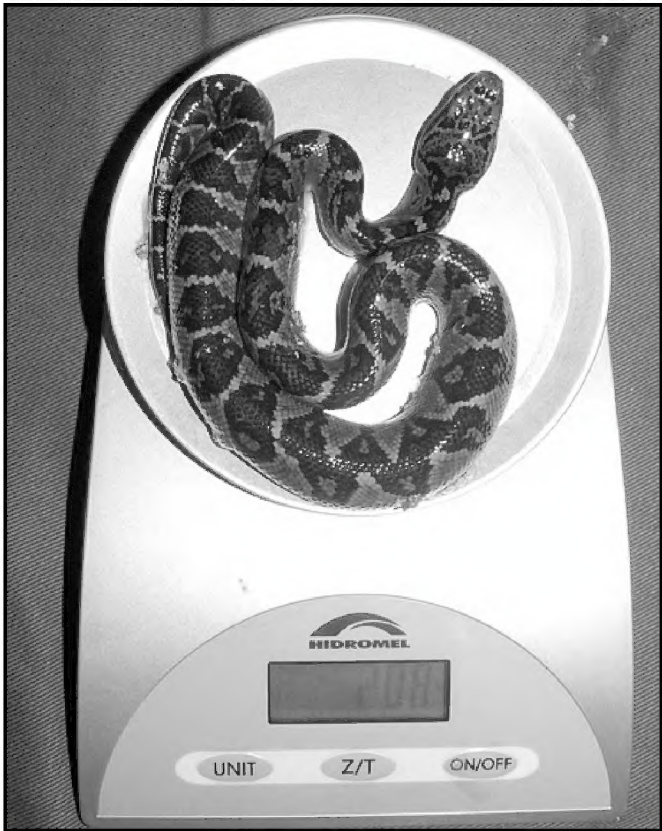
And perhaps the most exciting aspect about this genus is that its history is being written at this very moment. Captive breeding challenges apart, even its range distribution has just changed. It's 10 June 2009 7:10 P.M., and after months of

search, for the very first time one can place *Lachesis* in Maranhão State, Brazil (Dr. Marluze Pastor, Chief of the Federal Agency Ibama in Maranhão, and colleagues, detailed personal communication). A true never-ending story.

(Photos by Rod Souza, Fabio Coppola and Sandy Hill)

Literature Cited

Zamudio, K. R., and H. W. Greene. 1997. Phylogeography of the bushmaster (*Lachesis muta*: Viperidae): Implications for Neotropical biogeography, systematics, and conservation. Biol. J. Linnean Soc. 62:421-44.



How Fast Can You Crawl? Mobility and the Distribution of Snakes in Southeast Australia

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Abstract

The observed distribution of snakes in southeast Australia is assessed on the basis of the climate tolerance of all relevant taxa, inferred distributions at the time of the end of the last glacial period (about 12,500 YBP) and that of the present (taken as being from 1985 to 2008). While many authors have given many reasons or alleged factors for the observed distributions of snakes in southeast Australia, this paper suggests that perhaps another overlooked and critically important factor determining distribution of snakes in Australia's southeast is the *relative mobility of the taxa combined with snake/snake interactions*. This is as opposed to factors such as habitat preference, climate/cold tolerance, food availability or others previously invoked as paramount in determining modern distribution patterns.

Introduction

Southeast Australia (taken here as including most of New South Wales, all of Victoria, Tasmania, and nearby parts of South Australia), has been heavily collected by herpetologists over the last 200 years (since settlement by Europeans starting in the 1770s). Texts such as Cogger (2000), based on a summary of data from earlier literature and museum records give a fairly accurate picture of snake species and genera found in this region as well as broad distributional data.

Notwithstanding this, Cogger's text is based primarily on data sourced from his home state of New South Wales. In fact, excluding Wilson and Knowles (1988) (two Queensland-based authors), all major texts on Australian reptiles (including mine from 1989) have been written and published by Sydney (New South Wales) based authors.

More recently I have been based in Victoria, and while I can say that all the aforementioned texts are broadly accurate in their distribution information, none of these texts have given particularly accurate information in terms of Victorian taxa.

Another book on Victorian snakes, Coventry and Robertson (1991), is perhaps the most accurate in terms of distributional records for the snakes from Victoria, being written by persons from Melbourne, but on inspection, for even the most common taxa, is riddled with errors. Despite inaccuracies relating to death adders, red-bellied black snakes, and brown snakes (see below), the distribution records and southernmost limits for most snake taxa in Victoria as given in that book do not alter the arguments of this paper and conclusions drawn, in terms of southern migration of species.

By and large Coventry and Robertson (1991) overstate the southern limits of distribution of taxa, including the black and brown snakes, but the relativity between taxa in terms of southern limits remains in line with the real picture, albeit exaggerated. For the first time, these distribution limits are assessed against the known limitations of the taxa themselves to show that all species but three were until settlement advancing south and their distributions advancing beyond that seen.

Black snakes and brown snakes

Coventry and Robertson (1991) state that both black and brown snakes are common throughout metropolitan Melbourne and environs, including all parts of the Mornington Peninsula. In fact, black snakes are absent from all areas within 35 km of the Melbourne Central Business District (CBD), including all areas south of the CBD, which includes the Mornington Peninsula and running further south to the Victorian south coast. Brown snakes are found north and west and very slightly southwest of the CBD, but not south of the CBD or on the Mornington Peninsula or environs as stated in the book by Coventry and Robertson.

The basis of the distribution maps in the text are so-called dot maps with "confirmed records" followed by a lighter shading of "probable distribution," which generally overlaps and joins up the dots. The authors say that the "confirmed records" are derived from reliable records held by the wildlife department in a computer database. However this in turn is based largely on identifications by field workers who may or may not have herpetological training.

The database is unreliable, with all attributed reports of black and brown snakes from south of Melbourne being readily corrected to be copperheads, which occur in two (and other) color phases, even within a single locality and are routinely confused by people as being of the wrong taxon. A record of the same department for a death adder on the Murray River at Walhalla Island, northwest Victoria, by Peter Menkhorst (a mammal expert), based on an illustration in a book by Hal Cogger and quoted as accurate for many years was later ascertained to be a record for a DeVis's banded snake (*Denisonia devisi*), previously unknown from Victoria, but since found to be common in the relevant region.

Further unreliability of the distribution information in the Coventry and Robertson text is seen in their treatment of copperheads (genus *Austrelaps*), which gives broadly overlapping ranges for the two identified forms, "lowland" (*A. superbis*) and "highland" (*A. ramsayi*). The alleged diagnostic feature be-

tween the taxa in this book and in the original paper separating them is the definition of the white markings on the labial scales (the “highland” copperhead having more distinct markings). As it happens, this characteristic is more fluid than originally thought and varies between specimens, the result being that field workers often can’t assign a specimen to either the highland (*ramsayi*) or lowland (*superbus*) “species.”

As there is no gap in the known ranges of either taxon and the only alleged diagnostic character separating the forms (the labials) varies, even between specimens of the same litter, and all obviously interbreed in the wild, there remains no firm basis for attempting to split the southeast Australian copperheads into two species. At best the variation is clinal, rather than based on specific separation. Hence for the purposes of this paper (and in reflection of my own considered views), all copperheads are referred to the species *Austrelaps superbus*.

A separate and geographically isolated form of *Austrelaps* from the Adelaide Hills (South Australia) and southwest of there, referred by authors to the taxon *A. labialis* is not relevant to this paper, save to say that as a cold-climate species, its distribution is disjunct, reflecting a retraction in range over the past 12,500 years.

They were here already

During the last glacial period, Tasmania was attached to the Australian mainland. As the world warmed about 12,500 years ago and sea levels rose, Tasmania was cut off from Victoria. It is reasonable to infer that the herpetofauna in both places was the much the same. Observed in Tasmania now are three snake taxa, namely tiger snakes (*Notechis scutatus*), copperheads (*Austrelaps superbus*) and white-lipped snakes (*Drysdalia coronoides*).

All three taxa remain common in the southern half of Victoria, including all areas south of and including the colder parts of the Great Dividing Range. That includes the region of Melbourne (the state capital of Victoria), and at least 100 km north of Melbourne. The three taxa are also found in colder parts of New South Wales including areas as far north as Sydney. Hence none of these taxa are regarded as northern invaders of Victoria (which for *N. scutatus* is contrary to a view by Rawlinson [1991]).

Those not originally from Melbourne

After temperatures rose, northern taxa were able to migrate south to invade new areas.

Melbourne is situated on a large bay in the south of Victoria, Australia (with coast stretching about 100 km further south on both sides), making Melbourne and its southern environs a logical southern point for northern species to be migrating towards in terms of this paper. These migrating snakes included species within the main groups of Australian snakes, namely pythons, small elapids (skink feeders as adults) and large elapids (usually just over a meter as adults).

Taxa included in these categories would be: pythons — Murray/Darling carpet snakes (*Morelia metcalfei*) and diamond

pythons (*Morelia spilota*); small elapids — small-eyed snakes (*Cryptophis nigrescens*) and little whip snakes (*Suta flagellum*); large elapids — eastern brown snakes (*Pseudonaja textilis*), red-bellied black snakes (*Pseudechis porphyriacus*) and death adders (*Acanthophis antarcticus*).

That the species are recent arrivals is inferred from the facts that:

- 1 – They are not in Tasmania.
- 2 – Their distributions are effectively continuous to their southernmost points and there are no outlier populations beyond this. That is they are not relictual populations.

This means that these species have invaded Victoria (and/or Australia’s southeast) from further north and at the time of settlement by Europeans (when habitat was unbroken by farms, roads and the like), their ranges were probably still expanding.

Inaccurate records

Before continuing, it is worth noting some inaccuracies that have crept into the records, which if taken at face value may confuse the picture given here of snakes invading from further north.

The Snakes of Victoria by John Coventry and Peter Robertson (1991) is based on records and specimens at the Museum of Victoria, which while as good as for any other state museum, have been shown to have defects in terms of reptiles sourced from Melbourne. Some reptiles lodged as coming from Melbourne may in fact have been stowaways from elsewhere. This situation has arisen as for considerable periods, curators of reptiles at this Museum have either not been herpetologists, or had a primary interest in reptiles, or alternatively have been appointed from elsewhere, with no immediate knowledge of the local herpetofauna, other than what they have read in the popular literature or identification manuals such as Cogger (2000).

This is mentioned in the context of the red-bellied black snake, a snake that occasionally turns up in Melbourne and hence shows up on the Museum’s own database, but is not native here. Another species here, the copperhead (*Austrelaps superbus*), commonly looks identical to the red-bellied black snake and can be distinguished only by the subcaudal scales being all single as opposed to being single and divided in the red-bellied black. Lay persons see copperheads that are black with a red belly and then mistakenly identify it as the better known red-bellied black snake.

Even reptile hobbyists and alleged “experts” whom I’d assume would know better routinely confuse the two species on a regular basis. As recently as June 2008, a Melbourne Zoo reptile keeper Jon Birkitt told a local newspaper that a snake killed in the northern suburb of Roxburgh Park by a resident was a red-bellied black snake (Brown, 2008). I later ascertained that in fact it was a copperhead. The journalist said to me “surely the man from the zoo would know?”

Add to that the small number of “genuine” red-bellied black snakes lodged in the museum and there becomes a general perception that red-bellied black snakes are native to Melbourne. This is perpetuated among local herpetologists so that

when I arrived in Melbourne in 1985 (after 18 years in Sydney), I was led to believe that red-bellied black snakes were a common species here. This is also what most books and literature report, including my own book (Hoser, 1989), which was based on reports I'd erroneously believed as coming from reliable sources.

It is only after catching snakes in all suburbs of Melbourne for many years that it's become apparent that red-bellied black snakes are not a part of Melbourne's fauna. It's that simple!

The species is, however, common in areas about 125 km east of Melbourne, starting just east of Traralgon, and about 70 km north of Melbourne (starting north of the Great Dividing Range). Beyond either point it is a common species. Specimens commonly turn up in Melbourne after climbing into parked cars that are then driven from the relevant areas back to Melbourne, or alternatively in boxes of fruit and vegetables shipped from the growing regions in northern Victoria where these snakes dominate.

As a licensed snake catcher (Hoser, 2007) who catches many snakes a year, I catch an average of one red-bellied black snake a year in Melbourne, all of which so far have had their original (non-Melbourne) source identified.

As another note of interest, I catch an average of two Queensland carpet pythons (*Morelia mcdowelli*) a species not found within 1,000 km of Melbourne, per year, all obviously being either escaped pets or "stowaways." I mention this as no one has yet claimed these to be native to Melbourne, even though they turn up here.

In line with other large elapids, red-bellied black snakes are as a rule, very common where they occur naturally. There are no such sites in Melbourne, again indicating they are not from here. However at the southern and eastern limits of the range of these snakes, this is the very case. The snakes are common. The same applies for other taxa "invading" from the north, be they death adders, carpet snakes or eastern brown snakes.

Notwithstanding the fact that the specimens of red-bellied black snakes that are caught on "call outs" tend to come from the most heavily urbanized areas or otherwise settled areas lacking snakes, the fact is that in the last decade it's become apparent to me and all the other licensed snake catchers in Melbourne that the species is not native to Melbourne and that there is no place or suburb that the snakes can be found and caught.

All other elapids native to Melbourne (six species), are common where they occur and easily found. With rare exceptions as noted above, regular "call outs" for red-bellied black snakes invariably turn out to be copperheads.

Red-bellied black snakes—they have never been native to Melbourne

For all taxa moving south in Australia there is a pattern whereby at the leading edge of their southernmost limits they are very common, readily found and readily caught. This is seen for green tree snakes (*Dendrelaphis punctulatus*) south of Sydney, brown tree snakes (*Boiga irregularis*) north of Sydney

Harbour, death adders (*Acanthophis antarcticus*) around Bega in southern New South Wales, Murray/Darling carpet pythons in the Warby Ranges 10 km south of Wangaratta, brown snakes on Melbourne's northern fringe and so on. The same is seen for the red-bellied black snakes around Tallarook at about the southernmost limit of their known distribution, about 70 km north of Melbourne.

For black snakes this abundance is not seen in Melbourne. It's simply not possible to go anywhere in Melbourne to find a black snake on demand. Hence it's unlikely the species has ever been native to Melbourne (except as stowaways or similar) since at least the beginning of the last glacial period! The sometimes mooted idea that the species may be rare and cryptic in Melbourne is also laughable, based on what is well-known about the species. The fact is that they are large and hard to miss where they occur.

Further misinformation on red-bellied black snakes

On the Museum Victoria website (Anonymous, 2008) is an account for red-bellied black snakes. Under the heading "Distribution and habitat" it reads:

"It is widespread in eastern Victoria; north of the Dividing Range it is often associated with water courses. It is also relatively common in Melbourne's east and has been recorded around Bacchus Marsh, Park Orchards, Bayswater, along the Plenty River in the South Morang area and around the Merri Creek in the Campbellfield to Somerton area."

The Bachus Marsh record is credible in that the Lederderle Gorge north of there, broadly equates with the known southwest limit for the species, but also happens to be well outside of the suburban Melbourne boundary.

The other records, all well within the Melbourne metropolitan area (broadly along the 25 km line from the CBD running from the north (Somerton) to the east (Bayswater)) are clearly erroneous and based on copperheads of identical color, which are the dominant species in all these areas. I regularly catch such specimens (black with red belly) in all these areas. And invariably they are misidentified by others as "red-bellied black snakes."

The mention of Park Orchards as a location for red-bellied black snakes is perhaps the best evidence of a general misidentification of copperheads. This is the suburb I have lived in over the last 7 years. It is semi-rural and in that time of hundreds of snakes I have seen here, none have been red-bellied black snakes.

However again copperheads of the same color are common here and even more so along the ridgeline running from the Maroondah Highway ridge, along North Ringwood, Warranwood and Wonga Park. Beyond that area, to the upper Yarra Valley (north or east) melanistic copperheads become the more common color phase for the species.

As of 2008 and in the years immediately prior, the reptile curator at the Museum Victoria was Jane Melville, a professional herpetologist. Not resident of Melbourne before she took up the position, her own actual collecting experience of Melbourne's snakes was effectively nil, which is a situation she happily concedes. Her herpetological experience and training is

extensive, but not in terms of Melbourne's snakes. Hence her only real knowledge of snakes in Melbourne is what others have told her, including the general view that red-bellied black snakes are native to Melbourne.

Her predecessor, Diane Bray, had her main interest in fish and managed the reptile collection in the absence of a "dedicated" curator, the position being vacant on the retirement of John Coventry some years prior. Her main role was to catalogue and file specimens as lodged by the public and to respond to public requests to examine specimens and the like. This of course was in addition to her main line of work which was studying and classifying fish.

As both relevant taxa (copperheads and black snakes) are common in the southeast Australian region, get moved about by people often and as a result turn up all over the place, it isn't surprising that until now, no one has ever actually tried to resolve the southernmost distribution limits of the black snake taxon.

I also plead guilty to aiding the misinformation about red-bellied black snakes in Melbourne until recent years. I was advised by herpetologists and others of the fact and repeated it in good faith, including in printed material. I now know this information to be erroneous and generally based on misidentified copperheads, aided at times by the occasional "stowaway" red-bellied black snake, giving apparently credible evidence of the concept of red-bellied black snakes in Melbourne.

Genuine red-bellied black snake call outs

For the record I shall identify here where I or fellow licensed snake catchers have found (genuine) red-bellied black snakes in Melbourne on reptile call outs in the period 2003–8 and their original source:

- Alphington, came in with shipment of paper (myself).
- Broadmeadows, found next to railway yard where goods from northern Victoria are shipped in (myself).
- Toorak Road, Glen Iris, on footpath, apparently having alighted from a car that had recently traveled to northeast Victoria (Scott Eipper).
- Langwarrin (2), both snakes having alighted from cars driven to the Omeo region of northeast Victoria. Both snakes in the same street came from cars driven to the region on a weekly basis over several years and had lodged in the two houses either side of the man who did the trips, with both snakes taking up residence in "compost bins" (both caught by me).
- Mount Martha shopping strip, for two specimens apparently imported with fruit and found in a fruit shop (Barry Goldsmith).
- Montmorency, where snake was removed from a car that had been driven back from a fishing trip at Barmah Forest, northern Victoria (myself).

Notable is that none of the above locations were near any bushland or likely refuges for the species, indicating all had been brought into the localities by human means.

As to how often snakes get into cars and then get driven to other locations, as seen from my own capture records, I get about two calls a year for such snakes. However in northern and

eastern Victoria, where black snakes are common, this species is clearly the one most commonly seen entering cars or engines, with snake catchers in these regions reporting a much higher incidence of this.

By way of example, twice when doing snake shows at agricultural shows (Swan Hill and Orbost), I have had to adjourn proceedings to remove a red-bellied black snake that had lodged underneath a car's bonnet on top of the engine. Please note that in these situations, I have literally been passing through these towns for one or two days only and not been employed as the local snake catcher.

No death adders in Victoria

For death adders, the situation is that there are no known extant populations of death adders in Victoria. There are old (1800s) records of death adders along the Murray River of Victoria, in the vicinity of Swan Hill in northwest Victoria. There are no known museum specimens to back up these records, only notes! Bearing in mind that locations given for specimens in the 1800s were often inaccurate in that the locations given often related to point of shipping, rather than point of capture, it is possible that the specimens referred to may have come from some distance north of that given.

The region has long been degraded for agriculture to such an extent that the snakes are likely to be extinct from the exact localities given. Nearby areas of suitable habitat (including for example Sunset Country), lack death adders (ascertained from extensive searching by herpetologists for the species in the areas), leading to a general view that the old records may be inaccurate due to the fact that otherwise it would make sense for death adders to be in areas such as Sunset Country, Victoria (northwest of the state), where they are not.

What the above also means, is that any death adders in northwest Victoria (alive or recently extinct) derive from stock from northeast of here (in New South Wales) as opposed to being of the South Australian/west Australian stock (a different subspecies).

The historically recorded sites along the New South Wales-Victoria border do broadly correlate with the expected southern limit for the death adder taxon based on known migration rates (extant distributions) for other snake taxa in terms of the New South Wales coast and inland New South Wales-Victoria.

However, for the purposes of this article it makes little difference whether or not the northwest Victorian records are accurate, as death adders have also migrated south along the New South Wales coast and ranges to within about 100 km of the Victorian border, where they are very common. However none have been recorded on the Victorian side of the border in identical bushland and in spite of extensive collecting by herpetologists.

Southern limits for the other taxa

In terms of their southward migration, the eastern brown snakes have a continuous distribution from Melbourne's northern outskirts (where they are very common) right through Aus-

tralia and into New Guinea (also cut off from Australia during the last interglacial).

However, no brown snakes are found south of the Melbourne CBD or beyond into areas such as the Mornington Peninsula, Wonthaggi or West Gippsland. This is spite of the distance being small and habitat perfectly suitable for these snakes, with the species being found in identical habitat (and climate) elsewhere in Australia.

The distribution of the little whip snake (*Suta flagellum*) mirrors that of the brown snake to the north and west of Melbourne, although at the southern limits west of Melbourne (and up to 200 km west) in some areas one or the other taxon may be found up to 20 km further south than the other.

As noted earlier, the red-bellied black snakes have a similar distribution to that of the browns in southeast Australia, the only obvious difference being that they are not quite as far south. East of Melbourne the main ridge of the Great Dividing Range is high (often capped with snow). Due north of Melbourne the height of the ranges is lower and this remains the case further west. This is mentioned because for blacks, browns and little whip snakes, all seem to have had more success in crossing the Great Dividing Range west of Melbourne than from the east. In fact the red-bellied black snakes are only found south of the Great Dividing range in a small area about 80–100 km northwest of Melbourne in the general vicinity of Castlemaine with reliable reports of the species from the nearby Lederderle Gorge, northwest of Bacchus Marsh. That river in turn runs into the Werribee River (on Port Phillip Bay), giving the species a long-term route into Melbourne and environs.

Carpet pythons never got as far south as the Great Dividing Range. If one draws a horizontal line through the Warby Range 10 km south of Wangaratta, in turn about 200 km north of Melbourne and runs it across Victoria to include regions north of this line, you find the Murray/Darling carpet pythons (*Morelia metcalfei*). Further north again and on the New South Wales side of the Murray River, you find death adders.

While the highest and coldest mountains of the Great Dividing Range are northeast of Melbourne, and for one reason or other have formed a largely impenetrable barrier to invading snakes from further north, a second invasion front has been along the coastal strip running from New South Wales and into Victoria, with most species getting to the eastern edge of the Latrobe Valley at around Rosedale. Here we find the western limit (on that front) for brown and black snakes.

Diamond pythons (*Morelia spilota*) the coastal equivalent of the Murray/Darling carpet (*Morelia mcdowelli*) made similar progress to the carpets and also crossed the border to Victoria (here being further south), but only made it about 50 km (at best) over the border) giving it similar penetration south. Death adders, as already mentioned never quite got as far as the Victorian border.

All the taxa referred to so far reflect a suite of species with current ranges centered on about the latitude of mid New South Wales, about 800 km straight line north of Melbourne. That is the faunal suite characteristic of the modern day Murray/Darling

basins and New South Wales coastal plains and ranges, each invading south via the logical lowland routes.

Other taxa whose ranges come from further north (as the center of distribution) have also migrated towards Victoria, either just crossing the border, or not quite. Included here, but not considered in the context of this paper are taxa such as the southern form of western brown snake (*Pseudonaja nuchalis*), the coral snake (*Simoselaps australis*), DeVis's banded snake (*Denisonia devisi*) and mulga (king brown) snake (*Cannia australis*), all of which have a center of distribution about 800 km straight line north of the other suite of species.

Distributions expanding

While 200 years of European settlement is a split second in geological time, and in that time a lot of movement of reptiles has been arrested due to the building of broad acre farms, major highways, towns and the like, some southern migration of the above taxa has continued.

Brown snakes were in the 1980s confined to Melbourne's north, northwest and Maribynong Valley, although also common due west of Melbourne at Melton, Bacchus Marsh and nearby. Few if any were seen south of the Yarra River. By 2000, records south of the river were increasingly common and in areas of the city of Manningham formerly only known to have tiger snakes (including Westerfolds Park), brown snakes started to become common. Likewise for parts of Ivanhoe that previously never had snakes other than tigers. These are all heavily urbanized suburbs at the limit of the known range of brown snakes.

In 2007, a brown snake was caught in the You Yangs about 60 km southwest of Melbourne, about 20 km straight line from Bacchus Marsh. Collectors from the area expressed surprise that a brown snake had turned up so far south.

South of the You Yangs are Lara and Geelong, with brown snakes unknown from these areas or south of there. However there are no physical barriers preventing the snakes invading these regions.

The Colac area in southwest Victoria is also of interest in terms of the southward spread of brown snakes. Historically the region was covered in fairly dense forest and the local snake fauna consisted of tiger, copperhead and little whip. (White-lipped snakes occurred in pockets, mainly south of there.) North of Colac, brown snakes occurred, but south they didn't. Put simply, the brown snakes have turned up further and further south and in the invaded areas, the relative numbers have consistently risen.

The "new" habitat of most of the region is open farmland, which both reduces the underlying densities of all snake species (including cannibalistic copperheads) and enables the brown snakes to breach what was previously impenetrable habitat. In terms of the thermal requirements for egg-laying, the new habitat also enables the mobile brown snakes to readily find and use suitable ground-level laying sites with ready access to sunlight to heat and hatch the eggs, none of which would have been widely available in the original forested habitat.

Distributions explained—it's not too cold

That these taxa moved south during the recent interglacial is not really in dispute. A perusal of any relevant reptile book sets out the distribution maps for each taxon and for each there is a distinctly southern limit. With temperature being an obvious limiting factor on reptile's distributions, there has until now been no questioning of the doctrine that temperature alone has been the main limiting factor for the distributions of these taxa. Surely as you go south it gets colder?

However, examination of these species' distribution reveals a starkly different picture. With the exception of *Suta flagellum*, all the invading taxa are found in the vicinity of Sydney, New South Wales. And other species in the genus *Suta* are found around Sydney, including for example *Suta dwyeri*. All the invading taxa, including *Suta dwyeri*, are found in the Blue Mountains and/or nearby hilly regions that are higher in altitude and significantly colder than either Melbourne, coastal Victoria south of Melbourne or the plains and ranges north of Melbourne, and anywhere else between where they are found and these co-joined regions.

Furthermore, in the case of Victoria, it is not as one moves south that it gets colder. In the materially relevant respects, the reverse is true. North of Melbourne where many of these invading taxa occur, the elevation is higher and hence the temperatures cooler. Heading south, temperatures rise (as elevation declines) and so lack of heat cannot be a limiting factor in terms of these species moving south.

While northern areas away from the coast get warmer in summer, this heat (often excessive and well over 30°C, is well above preferred temperatures for the relevant snakes, giving no major advantage to them over southern areas. More important, the potentially hostile extremes of heat and cold are actually avoided as one moves south and towards the coast. In other words it is not cold that prevented any of the invading taxa from getting to Melbourne or beyond.

While all the invading taxa have certain habitat requirements or preferences, observation of these taxa in their known ranges shows that they are adaptable and invasive of habitats and can apparently tolerate habitats beyond their known distribution limits.

While it may be possible to argue that taxa like death adders require virgin bushland and that perhaps aboriginals in years past burnt and degraded too much bush to prevent their southern migrations, this argument cannot possibly be used to explain failure of wide-ranging habitat liberal taxa like black, brown or carpet snakes to get further south. The large elapid taxa in particular live in all kinds of habitat, including severely degraded, as seen by their abundance in the most intensively farmed regions and in all other habitats in their known distribution ranges.

With climate or "cold" being eliminated as a factor stopping the spread of these species south, one must look at other possible factors.

The most obvious thing seen by comparing the invading taxa and where their southernmost limits of distribution are, is that

the more mobile taxa got further south. Brown snakes, the most mobile of the large elapids, got furthest south. Black snakes also quite mobile, broadly shadowed the brown snakes, except in western Victoria, where the brown snakes got about 50 km further south (on average). Less mobile, the carpet snakes, crossed the Victorian border, but only just, making it an average of about 100 km north of the black snakes, while the death adders, (based on known distributions along the New South Wales coast), didn't quite get as far as the Victorian border.

As a well-established rule, snakes consistently managed to get further south when migrating east of the Great Dividing Range, as opposed to the same taxa migrating to the west of it, as seen by the known limits of black, brown, death adders and carpet/diamond snakes.

As for whether or not these taxa can survive in Melbourne, the result is already known. They can! Escapees thrive here! All the black snakes, carpet snakes and diamond snakes that I catch in Melbourne tend to be well-fed on local food and in good general health.

Another factor—other snakes

However, how fast a snake can crawl can't be the whole explanation. Studies of invasive species, such as cane toads (*Bufo marinus*) in Northern Australia have shown traveling speeds of several km a year for the invasion front. Now these feral toads are radically different to taxa that have evolved in this continent and so it'd be expected that factors may be wildly different for them as opposed to taxa that have co-evolved over millions of years.

Assuming the last glacial period to have ended about 12,500 years BP, it would appear that short of some unknown calamity, even at just 1 km a year, any of the invading taxa could have covered all habitable parts of Victoria by now, if invading a new area was as simple as moving in.

I have of course omitted "mini-ice ages" that may have impacted on migrations and for good reason. The small elapid species, namely *Suta flagellum* and *Cryptophis nigrescens*, have in sharp contrast to the large species managed to successfully colonize almost all possible areas of suitable habitat that can support them, or at least all that which they obviously prefer. That these invaders haven't been knocked out by a calamity, would indicate that none has been big enough to affect the overall picture.

Also the speed and success of the invasion of the smaller elapids (as opposed to the larger ones) would indicate that what has slowed the invasions of the larger species hasn't affected the smaller elapids in the same way. Hoser (2005) detailed a well-defined pecking order in terms of snakes. That paper showed that a major determinant of snakes distributions in given localities was other snakes.

Since that paper was published, further research here has shown that the key factors indicating likely dominance of taxa (between snakes and/or lizards) identified here are in order of importance listed as:

- Egg-laying versus live-bearing

- Ambush versus stalking (in feeding)
- Lack of cold tolerance
- Potential mobility of snake

Habitat partitions and adaptations are also important in the real world situation, but were excluded from testing at our facilities for several reasons, including difficulties in standardizing tests for this.

Another, perhaps critically important factor not tested, was competition between species in the form of potential cannibalism. This factor gives copperheads (*Austrelaps*) a major advantage over competitors where it is numerous (see later).

Perhaps a major impediment to the successful colonization of regions south was other snakes of other species, as in those already there. Two of three were large elapids. This may mean that in terms of the invading snakes and in a world devoid of modern human influences, unless and until the invading snake taxon gets sufficient numbers in the region of the invading front, then they cannot push their species to new regions. The end-point of the argument being that competition for already occupied habitat by invading taxa may greatly slow the migration of these taxa.

As an alternative explanation, most snakes being forced to new habitat (by whatever means) do, for a variety of factors (but mainly due to already resident snakes) fail to survive. A similar scenario is seen for translocated reptiles and other animals (see Hoser, 1995). This is particularly so for sedentary and less mobile taxa like the death adders and pythons.

In the case of the high mountain barriers north and east of Melbourne referred to earlier, one part of this barrier starts at about Kinglake and runs around through just east of Healesville, through the Dandenong Ranges, Warragul and into the Strzelecki Ranges. Another runs through the high country and into Victoria. In the high country of New South Wales and into Victoria, black and brown snakes have made progress but not in terms of the high mountain barriers skirting the northeast of Melbourne. These mountains are (naturally) covered in dense forests and the dominant species here are copperheads. Copperheads are strong predators of other snakes, and when numerous literally eat out all competing snakes! Hence, where copperheads are strongest forward migration of other snakes would seem to be slowest.

In the case of Melbourne this is readily seen. Running due east of Melbourne from Kew (about 5 km east of the CBD) is a long ridge running along the Maroondah Highway to the Dandenongs. Except around the Yarra River at Kew (the start of the ridge), where there are tiger snakes associated with the Yarra Valley, the only snake native to the ridge-line is the copperhead.

The same pattern repeats in the region south of here, although further south along major waterways and the Port Phillip Bay where the Yarra drains, tiger snakes are again found. North of this ridgeline is the Yarra Valley, where tiger snakes dominate and as mentioned earlier, brown snakes are found as far south as here.

Historically it seems that this ridge of dense forest, with its copperheads was a sufficient barrier to prevent southward

movement of brown snakes. However with the urbanization of the area and a general drop in snake numbers overall, this ridge is now open to movement of other snakes, the result being that for the first time, in 2008, a young brown snake was found at the summit of the ridge in Ringwood.

Areas formerly only with copperheads have also had tiger snakes turn up. This is significant as in the backdrop of urbanization, copperhead numbers usually increase relative to browns and tigers, where all three taxa occur.

Because black snakes aren't native to Melbourne, no comparisons can be made. However in Sydney, the black snakes dominate urban areas and nearby rural areas as well, with their relative position improving against the competing taxa — browns and tigers.

The “copperhead” barrier

In terms of the cold-climate/copperhead barrier, it appears that the higher parts of the Great Dividing Range in Victoria, running from the Dandenong Ranges and east of there into New South Wales have formed a barrier to other snakes' movements to new areas, the only obvious exception being the small-eyed snakes (*Cryptophis*) a distinctly smaller species, which appears able to bypass severe competition with copperheads in marginal and hilly habitats.

This barrier also runs south of the Dandenongs (and the ranges near the Latrobe Valley, south of here, through west Gippsland and includes west Gippsland, broadly west of Wilson's Promontory. While in terms of physical or habitat obstacles, there does not seem to be (historically) any major impediment stopping southern movement of taxa through Melbourne, other than the fact that the main Great Dividing Range barrier north of Melbourne was only breached in recent geological time and hence the relevant taxa, never got further.

Thus there is a section of Victoria starting roughly at the Melbourne CBD, running roughly east to about Wilson's Promontory, where the only large elapids to occur are the original inhabitants, namely tiger and copperhead.

Testing the copperhead barrier hypothesis

Testing the theory isn't something that can be done in a lab. However using Australia as a giant-sized lab, the hypothesis can be assessed.

In southwestern Australia, similar genera of snakes occur to the southeast. These are of course, *Pseudechis/Cannia*, *Notechis*, *Pseudonaja* and *Acanthophis*. All have penetrated considerably further south (or cooler climates) than is seen in Victoria, including across the south Australian parts of the Great Australian Bight and beyond. The only notable absence in the large elapid fauna of the southwest as compared to the southeast is the genus *Austrelaps*. In the absence of other obvious factors, it seems populations of copperheads have limited the southward movement of similar-sized elapids.

Southern limits of genera to the east and west

Noting that the same genera have migrated south via two

routes, these being along the east coast and secondly south, through the Murray/Darling basin and across the slopes and ranges northwest of Melbourne, the trend of different taxa getting further south via the eastern corridor is consistent. Known southern limits for the said taxa are thus as follows:

- Carpet/diamond python 37.6°S (east of ranges), 36.8°S (west of ranges)
- Death adder 37.1°S (east of ranges), 35.5°S (west of ranges)(Lake Boga record only)
- Red-bellied black snake 38.5°S (east of ranges), 37.5°S (west of ranges)
- Brown snake 38.5°S (east of ranges), 38.4°S (west of ranges)(Colac/Warrnambool regions)

Little whip snakes

Coventry and Robertson (1991) state that little whip snakes are found in all Melbourne suburbs. They are not. Broadly the distribution of the taxon mirrors that of the eastern brown snake in the region north and west of Melbourne. However, they appear to have penetrated all of southwest Victoria where suitable habitat exists in the form of stony plains and similar nearby environments, including granite hills and the like. They are not found in the heavily forested regions east and south of Melbourne, meaning that in Melbourne the eastern limit for the taxon is about the Plenty River Valley with none naturally occurring at any time in the region running south of the same line that limits the modern distribution of eastern brown snakes.

In other words, this taxon does not occur in any of the wetter eastern suburbs or anywhere south or southeast of Melbourne in any area beyond the eastern shoreline of Port Phillip Bay. North of the Yarra River, little whip snakes appear to be found no further east than the Plenty River Valley. Beyond that point, small-eyed snakes appear to take over the ecological position of the species. This indicates that both taxa compete directly and may limit one another's (or one or the other's) distributions. Brown snakes by contrast are found east of the Plenty Valley to the very edge of the colder parts of the main Great Dividing Range, within a few kilometers of Yarra Glen Healesville.

Small-eyed snakes

I have caught small-eyed snakes in hilly areas north and east of Melbourne. There are also records from hilly areas on all sides of Melbourne in National Parks, but I have no direct experience of the taxon at locations west or south of Melbourne. They have migrated into Victoria using the eastern side of the Great Dividing Range as their main line of movement into the region. They are cold tolerant and able to invade areas devoid of numbers of other taxa.

Dale Gibbons of Bendigo has never seen the taxon in his area (about 150 km northwest of Melbourne), and in areas of suitable habitat closer (e.g., Kyneton/Castlemaine) in spite of

extensive collecting over many years. This indicates that the taxon is either rare or nonexistent west of Melbourne, with Melbourne and/or western environs being the western limit of the distribution.

White-lipped snakes

The distribution of the white-lipped snakes broadly mirrors that of copperheads in Victoria. Hence it is found in cooler regions on all sides of Melbourne. It typically occurs in "pockets," where they are very abundant and easily found. Other areas of apparently similar habitat often lack the species. As is the case for copperheads, numerous color morphs may occur at the same locality.

Different starting points

A counter-argument to the proposition put here in terms of southward migrating taxa is that perhaps the relevant species of snake (or lizard) were either in the southern Victorian region before the others in the same faunal assemblage arrived, or alternatively had a further south starting point. This may be the case for a number of species with a more northern center of distribution as mentioned earlier in this paper. However in terms of the relevant taxa to this paper as named at the outset, these arguments do not appear to hold. All appear to have similar climate tolerances and a similar adaptability to all relevant habitats, as evidenced by their modern day distributions, particularly further north in New South Wales where in high altitude regions the taxa survive in areas cooler than those presently occupied in Victoria.

Conclusion

In light of the above, the only remaining conclusion to be drawn in terms of modern day distributions of invading snakes in southern Victoria as named, is that what's seen is a direct result of the relative mobility of the relevant taxa. This means the more mobile taxa were able to colonize further south faster and not as a result of any added pre-adaptation to the invaded habitat or innate ability to survive there.

Due to the apparently slow speed of the invasion fronts of all snake taxa as compared to feral invasive species introduced to Australia within the last 200 years, it appears that there are one or more factors at play greatly slowing the forward invasions. The most obvious factor worthy of investigation appears to include snake/snake interactions and how resident and/or dominant snakes are able to block successful colonization by invaders, which may themselves be mainly individuals forced out of their habitat by others of the same or similar species.

In the context of southern Victoria, it seems that copperheads in particular, have slowed the spread southwards of the three locally occurring elapids of similar size, namely the genera *Pseudechis*, *Notechis* and *Pseudonaja*.

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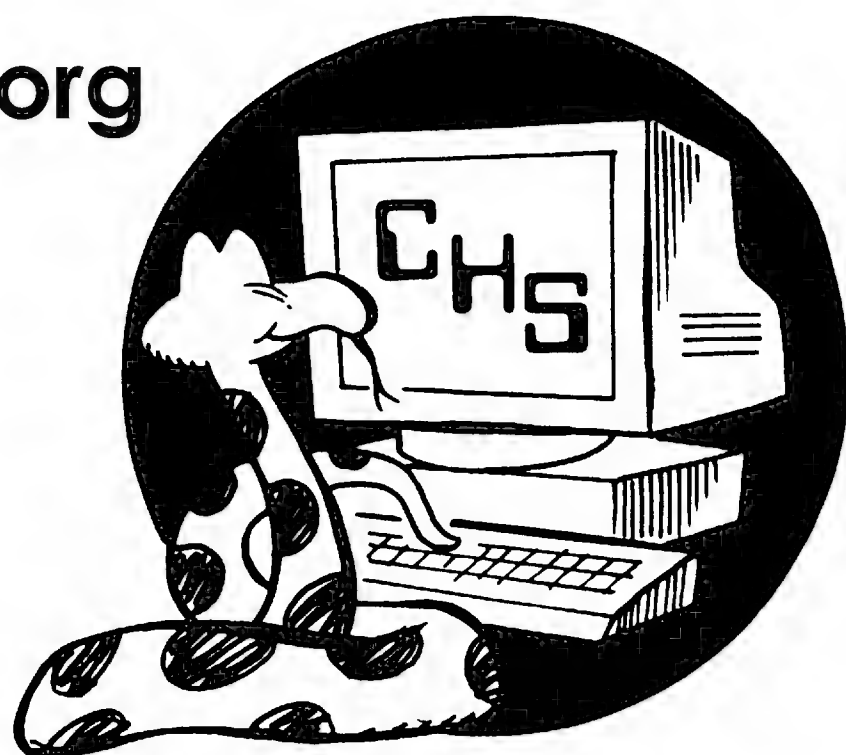
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Review: *Reducing the Risks of the Wildlife Trade* by K. F. Smith, M. Behrens, L. M. Schloegel, N. Maranao, S. Burgiel and P. Daszak. 2009. Science 324:94-95.

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The first half of this short article published in the Policy Forum section of *Science* is little more than a rehash of *Broken Screens* (Jenkins et al., 2007). The article ends with an evaluation of the proposed anti-animal law entitled the Nonnative Wildlife Invasion Prevention Act (HR-669) and includes the opinions of the authors on how to better construct that regulation.

Like *Broken Screens*, the first half of Smith et al. is an anecdotal narrative based on data chosen to support a foregone conclusion—it is a review of import data with comments based on selectively chosen negatives. The authors use the Law Enforcement Management Information System (LEMIS) with no mention of criticism (e.g., Reaser and Waugh, 2007) that data from LEMIS may be inadequate for this type of report.

This article carries the rubric: “Importation of wildlife into the United States, most with scant identification, brings an increased threat of disease and introduction of invasive species.” Despite the statement that this report is concerned with the U.S. wildlife trade, the entry paragraph of the report states that the “immense” magnitude of the commerce in animals consists “... of billions of live animals and animal products traded globally each year.” Apparently it is assumed that the reader will accept the implication that “immense” is bad. No attempt is made to explain “animal products,” even though they must significantly weight the “estimates of billions” of items cited by the authors without explanation, example, or support in the report that follows.

Indeed, the authors make every attempt to emphasize the magnitude of the trade in wildlife in the United States. To maximally inflate the numbers, the authors have combined all groups of vertebrates and invertebrates in the LEMIS database, even though different taxonomic categories of animals present dramatically different degrees of potential to become invasive (Jenkins et al., 2007). To further exaggerate the enormity of the wildlife trade, the report sums the trade over the seven-year period 2000–2006. During that period, nearly 1.5 billion animals were imported into the United States.

Indeed, that seems a spectacularly immense number. However, we note that during that same period of time, more than 2 billion poultry were raised and slaughtered in the USA. In 2007 alone, turkey production in the United States was 7.8 billion pounds (USDA National Agricultural Statistics Service, 2008).

In each of the years included in the report, about 200 million animals were imported, less than one animal per person in the country. Of course, about 96% of the total of imported animals were fish, and crustaceans—about 192 million animals.

The 8 million other animals include amphibians, annelid worms, arachnids, birds, coral, centipedes, echinoderms, insects, mammals, mollusks, reptiles, and a category identified as miscellaneous. Consider that there are more than 150 million dogs and cats in the United States (AVMA, 2007), 96 million cows (USDA National Agricultural Statistics Service, 2009), and more than 13 million reptile pets (APPA, 2007).

Our point is not to minimize the numbers of imported animals, but we do want to bring it into some comparable context of just how many animals there are in the United States. It is a big country with a lot of people who, collectively, have a lot of animals. We are neither surprised nor alarmed by the numbers of animal imports.

Smith et al. then discuss the numbers of animal shipments in which the animals are not properly identified. In 2006, the last year covered by this report, about 260,000 international shipments of animals were received in the United States. Coral and fish make up more than 95% of the total animals and about 60% of the shipments; about 33% of coral are identified and only 2% of fish are identified by species (Jenkins et al., 2007). In contrast, all terrestrial vertebrates are significantly better identified—90% of amphibians and mammals are identified to the species level (Jenkins et al., 2007). The authors note that imported animals should be labeled by species, as mandated by federal law [50 Code of Federal Regulations 14].

It would seem to us that the most suitable and parsimonious action to correct this violation of law is to refuse entry to incorrectly labeled shipments, in keeping with existing law. Instead, the authors view as more appropriate the action of new, more restrictive legislation, specifically referring to proposed anti-animal HR-669. Rather than hold USF&W Service accountable for their lapses in record-keeping and enforcement, the authors apparently believe it more expedient to restrict the entry of essentially all animals into the country until suitable “risk analyses” can be made for each species.

It is our opinion and observation that with regard to predicting ecological invasion, risk analysis is a form of fortune-telling. When a problem is apparent, such as an amphibian species that harbors the virulent chytrid fungus, then entry of that species into the country can and should be restricted. It doesn’t take an invasion biologist to make that call.

When invasion biologists declare that an animal species might be able to survive in nature in this country, that is an opinion cloaked in a thick veneer of “scientific modeling and analysis.” It is a guess, and nothing more.

The United States is a huge area with an extraordinary diversity of ecological zones and habitats. There is almost no animal species on this planet that could not purposely be introduced into a selectively chosen habitat somewhere on this continent.

Is it fair, expedient or correct to declare that since dromedary camels might be able to survive if introduced to southern Arizona, the species should be banned in the entire United States? [We note that, in fact, dromedary camels are included on the ridiculous list of “risk-annotated” species of concern in *Broken Screens* (Jenkins et al., 2007).] Yet that is the action proposed by the anti-animal Act HR-669, an action apparently supported by the authors of this article.

A quick summary of HR-669 is that all imported species

would be placed on a black-list and banned from importation. Then, based on risk analyses to be performed at some point in the future, *those species that can be proven to not become invasive* if released into nature can be moved from the black-list to a white-list, and only then imported, transported, captive-bred, and entered into commerce. This, of course, creates the conundrum that the invasion biologists have to prove a negative in order for a species to be placed on the white-list—they have to prove that a species cannot become invasive. This is logically impossible.

The hypocrisy and hubris of HR-669 is best illustrated by its preliminary white-list of 14 exempted species, ten of which are considered to be invasive species or risk-annotated species (Jenkins et al., 2007).

Smith et al. propose that along with the black-list/white-list approach of HR-669, a third category referred to as a “gray list” should be created. To quote: “Realistically, scientific information on the environmental, health, and economic impacts of many species in the trade is likely to be minimal. To support fair commerce we propose that, until scientific findings are released, gray-listed species that have been previously imported should be provisionally approved. . . .”

They go on to state: “H.R. 669 could be used to immediately deal with many traded species that have been *fully researched* by the scientific community.” [Italics and skepticism ours.] The next sentence refers to the chytrid fungus epidemic in amphibians, and then comes this statement: “There is excellent science identifying amphibian species that are likely carriers, which could be used to conduct adequate risk analysis.” We point out that the “excellent science” refers to a paper in press by one of the authors.

While it is amusing to note the confidence with which the authors regard their own research, we are not impressed with their proposed modification of HR-669. It still requires a scientifically and logically impossible argument to move a species from their proposed gray-list to the white-list. Also, we note that nearly all of the more than 3,000 animal species currently legally imported would properly have to be placed on the gray-list due to a lack of suitable data or published research.

Even though only a tiny percentage of all of the species included in the report might harbor zoonotic diseases, the authors hold as a priority the possible public health concerns

created by animal importation. To that possibility, the authors propose extralimital policies and practices to monitor animal species prior to shipping, suggesting a “third-party screening of selected species for high-priority diseases before shipping.” This is to be accomplished by some international super-agency not currently in existence.

To their credit, Smith et al. do allow that to avoid the economic hindrance that HR-669 or similar regulatory proposals might pose to the multi-billion dollar animal industry of this country, the captive-breeding of exotic species currently imported should be encouraged. They specify that this would both reduce the pressure on wild populations and reduce the risk of disease introduction. However, as written, HR-669 would permit captive-breeding only for white-list species, that being a tiny percentage of the species in the wildlife trade.

To summarize, the essence of Smith et al. is that it is a short opinion piece published in *Science* in which the authors (environmental and invasion biologists) propose that the government should put all imported animals in legal limbo, and then hire several hundred invasion biologists to perform risk analyses to sort out what might be “safely” imported. We can only imagine that in this current economic environment, this would take decades with only a minuscule percentage of the species ever re-entering commercial trade. This paper cites support for both *Broken Screens* and HR-669, and as such should be considered yet one more “scientific paper” initiated by and supporting the animal-rights agenda to remove animals from public hands.

Our comment is that, at least with regard to terrestrial vertebrates, the problems of invasive species are rare and require local action at the state level. Any anti-animal legislation on the national level such as proposed by this paper and embodied by HR-669 will directly, negatively, and unnecessarily affect the economy of citizens and businesses, and their cities and states. It grants the federal government sweeping power to confiscate the rights to legal property from citizens.

The paper ends with the dire warning that the cost of invasive species to the United States is \$120 billion annually. Smith et al. are surely quite aware that it is plant species and accidental pest imports that account for all but a tiny fraction of that figure. Terrestrial vertebrate animals legally identified, declared and imported are not the real problem, but they *are* the primary concern of animal-rights activists.

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What You Missed at the May Meeting

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What is it about people who play with venomous animals? Don't go jumping to conclusions. I like almost every one of them I've met, but they're a little different from your average herper. They talk about the times they've been envenomated as most of us would talk about the time we had a hangnail, but they include a few details involving the amount of pain and the tremendous swelling, with maybe the loss of a digit thrown in to keep the interest level up. It's not that they're bragging, simply relating some of life's little setbacks. That's just what happens when you mess with hots. As I think about it, I suppose that's only a little stranger than the average herper. With similar equanimity most of us mention the number of cages we clean or the number of times that feisty little eastern milk (*Lampropeltis triangulum triangulum*) tagged us or the time we dove into a patch of poison ivy after that *getula*. We talk about those subjects to almost anyone until we notice that the "normal" people who have been listening are looking at us with a curious expression, jaws usually dropped as they slowly back away furtively looking for the nearest exit. Of course, the incidents most of us describe are unlikely to be deadly, unless one is extremely allergic to poison ivy. Maybe it's just a matter of degree. Maybe folks who mess with venomous animals are just herpers to the nth degree. Maybe.

So allow me to introduce the May speaker. Through the efforts of board member Cindy Rampacek we managed to have Dr. Bryan Grieg Fry take a little side trip while he was in the U.S. and give a presentation to our group. Dr. Fry is Australian. He graduated with undergraduate degrees in molecular biology, philosophy, and psychology, and has a Ph.D. in biochemistry. He does venom research, specializing in the evolution of venom. He is in charge of the venom research unit in the Department of Biochemistry and Molecular Biology at the University of Melbourne and the BIO21 Institute. He's published many papers, traveled to many places, and handled many animals, most of them venomous. He hit the meeting like a rock star, surrounded by groupies and basking in the adulation emanating from his audience. I suspect that one reason that we had a large attendance that night was because he's a star of television, having appeared on many shows that I've never seen because I'm too cheap to get premium cable. But doing research on him I also discovered that he's very electronic-media savvy. His web site (<http://www.venomdoc.com/>) is an excellent source of information, as well as being entertaining. He runs a forum and has a blog (<http://venomdoc.blogspot.com/>). These days we can get to know a lot about our media darlings, maybe too much. I liked him immediately.

True to a person who handles media well, Dr. Fry gave an enlightening talk about his research, centering around his ideas on reptile venom evolution and his latest paper on Komodo dragon venom, while managing to make all of it understandable and entertaining. His visuals contained beautiful photos of animals, fascinating pictures of MRIs, and glorious charts in full color. And of course several references to the times he and friends had been envenomated. He maintains that the sole



Dr. Bryan Grieg Fry posing with an agitated desert spotted monitor (*Varanus panoptes rubidus*).

purpose of his research is to allow him to play with venomous animals, and he seems to work hard at achieving that purpose, but when he began his talk the scientist took center stage, and we were treated to a well-spoken review of some of his work filled with asides on a range of subjects that made us laugh and think.

Bryan started with stating that every order of animals has at least one lineage with venom, demonstrating how fundamental venom is to evolution and how important it is to the predator-prey contest. Snakes and venomous lizards evolved from a common ancestor with venom glands in the upper and lower jaws. All snakes evolved from this common ancestor, and nonvenomous snakes, of which there are relatively few species, have subsequently shrunk or totally lost the venom-producing glands. Dr. Fry made a point of saying that most of the snakes and many of the lizards that produce venom are not medically significant threats to humans, and he stresses that they do not require special handling. Your bearded dragon is no threat to you, nor is your corn snake.

Venom glands are not derived from salivary glands nor are venom proteins derivatives of saliva, though all of the venom proteins studied so far are derived from proteins that are already produced by the body for other purposes, such as anticoagulants. Venom is a prey-capture mechanism, not a defensive mechanism, and the fact that it may cause a "screaming, brutal, horrible, death" in humans "is just something fun for the snake" according to Dr. Fry. He went through a sampling of venomous snakes using pictures and factoids and anecdotes that demonstrated his main points and held my attention. Boomslangs (*Dispholidus typus*) weren't considered venomous until one killed an eminent herpetologist in the 1950s. The Egyptian catsnake (*Telescopus dhara*) has large venom glands but tiny rear fangs. The inland taipan (*Oxyuranus microlepidotus*), is the world's most venomous snake living in one of the world's most hostile environments and feeding on the world's toughest rodents, which it dispatches with long, hard, rapidly repeated



The world's most venomous snake, the inland taipan (*Oxyuranus microlepidotus*).

strikes. The tiger keelback (*Rhabdophis tigrinus*), is a rear-fanged snake that was popular in the U.S. and European pet trade in the '70s and '80s until a ten-year-old boy got bit by one and started bleeding uncontrollably. And there was a gorgeous picture of a Fea's viper (*Azemiops feae*), a snake that likes temperatures in the mid '70s and dehydrates when too warm, causing it to turn from a deep blue-black to a gray-black. Cross sections and MRIs of glands from different snakes followed, and a neat chart showing an evolutionary tree of venom and glands was displayed in full color accompanied by a discussion of the way various snakes have evolved both. He made a particularly interesting comparison of the two most venomous snakes in the world, the inland taipan and the brown snake (*Pseudonaja textilis*), the two so venomous that he compared them to the Australians in swimming competitions, "one, two, three, daylight and the rest of the world." The rest of the Australian venomous snakes fall on a continuum with the other deadly snakes in the world.

Next Dr. Fry discussed venomous lizards. He showed cool pictures of Gila monsters (*Heloderma suspectum*), lace monitors (*Varanus varius*), one of which caused Bryan to need two surgeries on his hand, a Chinese alligator lizard (*Shinisaurus crocodilurus*), and Mitchell's water monitor (*Varanus mitchelli*), followed by MRIs of the jaws of Gila monsters and Komodo dragons (*Varanus komodoensis*). The MRIs led to a discussion of his latest paper on the role of venom in the Komodo dragon and the extinct *Varanus priscus* (formerly known as *Megalania prisca*), a monitor lizard that reached perhaps seven meters (23 feet) in length. First he looked at how dragons and *V. priscus* might have taken the relatively huge prey upon which they probably fed. Strong bite force was eliminated when stress analysis proved the varanid jaws comparatively weak. The MRI of a dragon's skull was so cool that Bryan had it tattooed on his back. Systemic effects of bacteria are unlikely because the effects of bites are not consistent with a bacterial infection. He took the original bacterial study to task as poorly conducted. But some of the effects of varanid bites are consistent with venom. The bites often produce rapid swelling, prolonged bleeding, burning pain, and systemic effects such as muscle weakness and cardiac irregularities. When the proteins in the



A tattoo based on this MRI of a Komodo dragon's skull graces Dr. Fry's back.

glands of the Komodo were isolated, they were found to be consistent with the components of many reptile venoms.

Dr. Fry does not maintain that venom is the primary cause of prey succumbing, but that the venom exacerbates the extensive mechanical damage that the repeated biting accomplishes. I'm no scientist, and Dr. Fry said that his paper was so controversial that it took longer to get it published than it did to conduct the study, but I'm convinced by what he presented. Of course, that's like saying I'm no artist but I know what I like. I'm curious about the arguments that will be offered against the paper's conclusions. You can find the paper here: http://www.venomdoc.com/downloads/2009_Fry_Komodo&Megalania. His web site has many of the other papers he has published along with summaries of his views on the evolution of venom. It's well worth looking at if you're interested in these subjects.

In spite of the talk running a little late, the audience did not appreciably thin and many stayed when Bryan launched into his second talk. That's right, another speaker who gave us a bonus! The second talk was more of a travelogue off the top of his head. He had hundreds of pictures, a fraction of which we managed to see, most accompanied by interesting anecdotes, scientific facts, or witty remarks, but all managing to hold the members' interest for almost another hour. Since Dr. Fry is working on a general theory of venom evolution he has now expanded his studies to animals other than reptiles. We saw photos of him in the Antarctic capturing octopi (all of which are venomous along with cuttlefish and some squid), cuddling a very cute (oohs and aahs) but venomous slow loris (their venom glands are on their elbows!), fishing (one of his favorite activities), standing next to a hovercraft that they used in research (but he wasn't allowed to drive), digging out or trying to repair several stuck or damaged vehicles (he's tough on rental cars), holding vampire bats, Gila monsters, spiders, lizards, sharks, jellyfish, crocodiles, venomous and nonvenomous fish, frogs, and obviously snakes. Some of his pictures were less than flattering of him, showing that Dr. Fry takes his work seriously but not himself. He's having too good a time doing the stuff he loves and he seems excited to have new opportunities to get bitten by venomous animals other than reptiles. Yeah, those venomous dudes. A little different.



Dr. Fry is notorious for many things, one of which is his ability to destroy rental vehicles. Zero deductible means never having to say you're sorry.



Bryan didn't go into a lot of details about this photo, but alcohol and boredom were involved.



Just your average research vehicle. Bryan loves technology, but was disappointed that he couldn't drive the Hovercraft.



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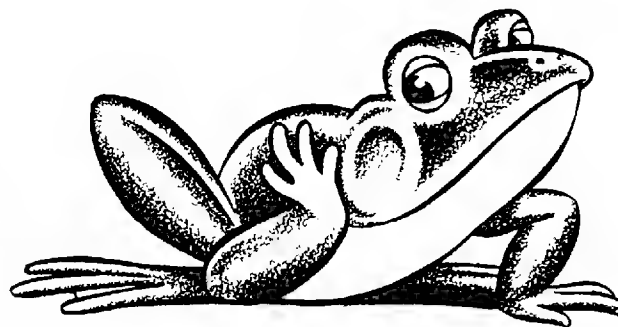
The Tympanum

Dear Mr. Archer:

I just wanted to thank you and the Chicago Herpetological Society for your donation of \$300 for the maintenance of utilities at the fox snake house in Lake County. I apologize for not acknowledging your donation earlier.

I also wanted to give you a brief update on the situation. In brief, the bad news is that the homeowner is proceeding with plans to eventually raze the home. We had tried to work out a potential sale of the property to the Forest Preserve but could not find common ground in terms of pricing and interest.

The good news is that Dr. Corn and the Conservancy have been working with the developer and the Lake County Forest Preserve District to find a way for the snakes to make a safe transition to a new hibernaculum. I think it would be most appropriate for Dr. Corn to provide the whole story but in short, the developer has been happy to cooperate and has ringed the home with fencing which directs any departing snakes safely to traps that Dr. Corn has set up. Dr. Corn has subsequently trapped



over 40 fox snakes which were released into the nearby wetland on 5/21. I've attached a photo of the release and will send a few more photos as well in subsequent emails. Dr. Corn continues to work to collect any other snakes that may be leaving. The Conservancy and Dr. Corn have also been in communication with the Lake County Forest

Preserve District, and as a result the District will be building one accessible hibernaculum nearby on Forest Preserve property that will allow Dr. Corn to continue his research. Preparations will need to be made in the fall to be sure that any snakes attempting to return to the snake house can be caught and placed in the new hibernaculum.

Thanks again for your help. Snakes have such a hard time in our modern world and deserve all of the help they can get. We're glad that groups like yours care about their fate. We hope, too, that this population of snakes will continue to survive long into the future. **Nathan Aaberg, Director of Development & Community Relations, Liberty Prairie Conservancy**



Herpetology 2009

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

BODY TEMPERATURES OF PREGNANT TIMBER RATTLESNAKES

L. C. Gardner-Santana and S. J. Beaupre [2009, Copeia 2009(2): 363-368] note that body temperatures of ectotherms critically affect their bioenergetics, and thus have consequences for multiple aspects of population ecology, including recruitment, survival, and population viability. These authors compared body temperatures and movement between gravid and non-gravid female timber rattlesnakes (*Crotalus horridus*) inhabiting northwestern Arkansas using radiotelemetry. Body temperatures ($n = 839$) were recorded from six gravid and five non-gravid adult female rattlesnakes using temperature-sensitive radiotelemetry. Mean T_b s were calculated for each hour of the day from 15 July through 22 August 2002 and used to construct a representative 24-hour body temperature profile. Gravid females had significantly higher mean T_b s in the early morning and again for most hours in the late afternoon and first half of scotophase. Overall snake T_b s were higher during the day and lower at night. Moreover, gravid females exhibited lower variation in T_b during late afternoon than did non-gravid females. Mean area used ($\pm$ SD) by gravid females (0.4 ± 0.4 ha) was significantly less than that of non-gravid females (2.4 ± 1.8 ha), and daily movement (18.2 ± 6.1 m/day) and overall distance traveled by non-gravid females (827.4 ± 234.4 m) was over twice that of gravid females (8.8 ± 4.6 m/day; 384.0 ± 236.1 m). Understanding the thermal ecology of reproduction in this viviparous capital breeder provides valuable information for habitat management and species conservation.

STRESS IN COTTONMOUTHS

F. C. Bailey et al. [2009, J. Herpetology 43(2):260-266] note that the increased encroachment of humans into natural areas is typically viewed as stressful for many wildlife species. A common stress response of many animals, including snakes, is the elevated release of the adrenal hormone, corticosterone. To test whether human encounters elicited a stress response in snakes, the authors monitored the levels of circulating corticosterone in free-ranging cottonmouths (*Agkistrodon piscivorus*) during staged interactions. When exposed to a high-level disturbance (i.e., capture and confinement in a bag) for 30 min, cottonmouths showed a significant corticosterone stress response as predicted. This response was four times that of the control treatment (i.e., immediately bled snakes) and shows that cottonmouths exhibit strong corticosterone responses to confinement. Conversely, blood corticosterone values for low-level disturbance (i.e., nearby human presence for 30 min) did not differ significantly from the control treatment. The lack of a strong stress response to low-level disturbance indicates that cottonmouths possess a seemingly adaptive mechanism of not being overly alarmed by the mere presence of a potential predator. This suggests that the occasional footpath encounters humans commonly have with snakes may not be stressful for some snake species.

MULTIPLE PATERNITY IN BLANDING'S TURTLES

J. M. Refsnider [2009, J. Herpetology 43(1):74-81] notes that multiple paternity is widespread among reptiles in general and turtles specifically. However, its frequency is highly variable even among closely related species. Paternity is an important component of the genetic mating system of a species, and it can provide insight into the social mating system of the species. The author investigated the occurrence and frequency of multiple paternity in a population of Blanding's turtles (*Emys blandingii*), a rare freshwater species. A high frequency of multiple paternity was detected in this population, with 13 of 16 clutches (81%) showing evidence of siring by multiple males at one locus and nine of 16 (56%) at two or more loci. Multiply sired clutches received approximately equal contributions by both, and rarely three, sires. Therefore, polyandry appears to be the most common reproductive strategy for females in this population. Evidence was also found to suggest that sperm storage between years may occur in this species. The high frequency of multiple paternity observed here suggests that multiple mating may be beneficial to females and/or their offspring. Further research is needed to determine whether this is the case and, if so, how females may benefit from multiple matings.

BOREAL TOAD DEMOGRAPHICS

M. K. Young and D. A. Schmetterling [2009, Copeia 2009(1): 117-124] note that like many species of amphibians, boreal toads (*Bufo boreas boreas*, Bufonidae) are declining throughout portions of their range. Recent efforts have focused on describing the ecology of this species, yet few studies have evaluated demographic characteristics that may influence the persistence of boreal toad populations. Because boreal toads often convey themselves down valleys via stream channels in some areas, the authors set upstream-facing hoop nets in early to late summer in several first- to third-order tributaries in two western Montana river basins to assess the sizes of individuals using streams and examine temporal and spatial variation in captures. They made 923 captures of juvenile and adult boreal toads. Adult females were up to 125 mm snout-vent length, whereas males never exceeded 105 mm. Females tended to be heavier than males and female weights were significantly more variable. Early-summer captures were dominated by juvenile toads <40 mm; late summer catches were largely of individuals >70 mm; and toads of intermediate size were rare throughout. In tributaries of one river basin, captures of toads were more widely distributed in late summer than in early summer, whereas in tributaries of the other basin catches were similarly distributed in both periods. The authors infer from these patterns that frequent and perhaps far-ranging movements by juveniles and adults are typical of boreal toads in this region. They contend that netting streams in summer represents a useful complement to breeding site surveys for understanding the demographics and distribution of boreal toads, and perhaps other non-breeding amphibians near streams.

Unofficial Minutes of the CHS Board Meeting, May 15, 2009

The meeting was called to order at 7:40 P.M. at the Schaumburg Public Library. Board members Dan Bavirsha and Brad Trost were absent.

Simon Jencius, a Licensed Professional Counselor who recently joined the CHS, described to the board a treatment program he hopes to set up at a suburban hospital to assist people in getting over their phobias. Snake fear is the single most common fear in the world. He is currently proposing to the hospital exposure with response treatment, which basically brings your fear to you and teaches you how to deal with it. He will be moving forward with volunteers and getting the program going with full support of the CHS.

Officers' Reports

Recording Secretary: Cindy Rampacek read the minutes of the April 17 board meeting to the board. Minor corrections were made, and the minutes were accepted.

Treasurer: Andy Malawy presented the financial reports and no questions were raised.

Membership Secretary: Mike Dloogatch read the list of recently expired memberships.

Vice-president: Jason Hood reported that the August speaker has been changed to Mark Mitchell, DVM.

Corresponding Secretary: Deb Krohn needs stamps and more note cards. Cindy Rampacek ordered the note cards and they will be shipped to Deb's home.

Publications Secretary: Aaron LaForge reported that the list of future speakers has been updated on the web site. The show coordinator and VP will have the ability to update their portions of the web site in the future.

Sergeant-at-arms: Dan Bavirsha reported there were 63 people at the April general meeting.

Committee Reports

Shows:

- Emily Oaks Nature Center in Skokie was pleased with Jason Hood's participation in their Earth Day event. They would like another presentation in November.
- The CHS will participate in the Chicago Wilderness "Wild in the City" event in Millennium Park, June 14.
- Argonne National Laboratory annual picnic, July 11.
- Central Stickney Park District, August 16, Noon until 11 P.M.
- Reavis High School, August 22.

Adoptions: Linda reported there was a bearded dragon that needed an abscess removed and thankfully Gerry Herrmann gave us a deal.

Old Business

Symposium 2009: Committee meeting to be held on Saturday, April 23, to narrow down speakers.

Business cards: More "invitation to a meeting" cards needed.

New Business

John Archer proposed that we give CHS memberships to the students who volunteered at 'Fest. Rick Hoppenrath made a motion to give the teen volunteers each a membership, Jenny Vollman seconded the motion and it carried unanimously.

John Archer brought up the possibility of hiring someone to maintain our web site. The board's consensus was to continue with our current volunteer labor.

John Archer requested that the CHS pay for him to enroll in a media seminar. Jenny Vollman made the motion, Rick Hoppenrath seconded the motion and it carried unanimously. Mary Hoppenrath will attend in the event John is unable to go.

Diamondback Trading Cards appreciated how fast we got their ad in the *Bulletin*.

Carol Freeman is looking to take photos of all the threatened and endangered species in Illinois. She has asked the CHS for help in locating herp specimens.

Round Table

Jason Hood reported that he has black-headed python eggs.

Aaron mentioned that SEWERfest is coming up August 1 and November 2. CHS has a free table—photo booth, tattoos, whatever we can put together.

Mike mentioned that this year's IHS, schedule to have been held in Monterrey, Mexico, has been canceled.

Simon hopes that his program will be up and running next time he sees us.

The meeting adjourned at 9:30 P.M.

Respectfully submitted by recording secretary Cindy Rampacek



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For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. Our mice and rats are vacuum-packed to greatly extend freezer life by reducing freezer burning and preserving vitamin and nutrient content. We feed our colony a nutritionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. For a complete price list please visit our web site, www.themousefactory.com. We accept all major credit cards, PayPal or money orders. Call us **toll-free** (800) 720-0076 or send us an e-mail at info@themousefactory.com. Write us at PO Box 85, Alpine TX 79831.

For sale: **high quality frozen feeders**. Over a decade of production and supply. Seven sizes of mice available: small newborn pinks up to jumbo adults. Prices start at \$25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: Rats—live or frozen. I breed rats for my collection of boas so only top quality lab chow and care will do, I'm now offering surplus animals for sale. Located in far south suburbs of Chicago. Only orders of 20 or more please, no large rats will be available. For current availability and prices, please e-mail Steve at smuys@sbcglobal.net.

For sale: books. three books on the only U.S. marsupial: *The World of the Opossum* by James F. Keefe, 1967, 144 pp., many b&w photos, traces the opossum's activities through the seasons, no DJ, (h), \$20; *Possums* by Carl G. Hartman, 1952, 174 pp., many b&w photos, detailed info about the animal's life history, role in folklore, behavior, and embryology, (h), \$20; *The Opossums* by Anne LaBastille, 1973, 32 pp., many color photos and drawings, part of the Ranger Rick children's series, (h), \$10; *The Snakes of Victoria* by John Coventry and Peter Robertson, 1991, 70 pp., many color photos, range maps, 6 figs., descriptions and natural history info, published by Museum of Victoria (Australia), (s), \$35; *Amphibians and Reptiles of Texas* by James R. Dixon, 1987, with keys, taxonomic synopses, bibliography (32 pp., literature from 1852–1982) and distribution maps, 434 pp., 25 b&w photos, (s), \$10; *Australian Reptiles & Frogs* by Raymond T. Hoser, 1989, 238 8½ × 11½" pp., 631 color photos of herps and their habitats, range maps, bibliography, info on captive husbandry, conservation, reptile photography, DJ, (h), \$135. (s) = softbound; (h) = hardbound. All books in excellent condition. \$3 postage and handling for orders \$25 and under; free for orders over \$25. William R. Turner, 7395 S. Downing Circle W., Centennial, CO 80122; telephone (303) 795-5128; e-mail: toursbyturner@aol.com.

For sale: Now taking reservations for '09 unusual garters. Please note that the ? indicates that the price will be determined at birth. Here's what is expected to be produced in June. **Easterns:** normals, \$25 each/2 for \$40, flames × Schuett albinos, \$200–250, flame albinos, \$500–600 (limited numbers), 100% het flame albinos (flames), \$250–300, 100% het flame albinos (normal looking), \$125, 66% poss het flame albinos (flames), \$150–200, 66% poss het flame albinos (normal), \$85, flames \$100–150, paradox albino Florida × Florida erythristic \$150–200, paradox albino Florida × flame \$200–250, **leucistic/leucistic flames**, \$450–500, 100% het leucistic flames, \$200–250, 100% het leucistics (normal looking), \$125, silver × Schuett albino, \$245, silver × erythristic (erythristic 100% het silvers), \$150, silver × West Virginia anerythristic eastern, \$200, silver, \$295, 100% het silvers (outcrossed), \$95, Carteret Cty × Schuett albinos × Carteret Cty × Schuett albinos (very limited numbers), ?, Myrtle Beach × Schuett albino × Myrtle Beach × Schuett albino, ?, anerythristic eastern - Mohr strain, \$350, flame 100% het anerythristic eastern - Mohr strain, \$195, 100% het anerythristic easterns - Mohr strain, \$150, melanistic eastern, \$35, Schuett albinos (numerous bloodlines), \$195–225, snow Schuett strain, \$195. **Plains:** normals \$25 each/2 for \$40, axanthic × axanthic (Possible super axanthic), ?, axanthic × snow (double het for blizzard), \$95, axanthic, \$45, Nebraska albino × high red plains, \$125, Nebraska albino, \$75, double het Nebraska snow (Nebraska albino × anerythristic), \$60, Nebraska albino × hypo, \$145, red plains, \$40, Iowa snow, \$75, red plains × double het Iowa albino × Nebraska albino, \$50, Iowa albino, \$75, anerythristic plains, \$45, Snowbino × quad het (expect albinos, anerythristics, snows and possible hets on these), hybino, \$195, 100% het hybino, \$75. **Central American:** *fulvus*, \$45, *melanogaster*, \$175 (limited number expected—first time available in the US), *cuitzeoensis*, \$250 (very limited number expected—first time available in the US). **Red-sided:** normals, \$25 each/2 for \$40, blue red-sided × Kansas albino, \$175, blue red-sided × anerythristic, \$150, blue red-sided × normal, \$95, golden red-sided × Kansas albino, \$100, Iowa albino red-sided × anerythristic (double het snow), \$275 pair, albino Kansas strain, \$300, anerythristic, \$75. **California red-sideds (new neon blue normal blood-line):** hypo, \$350, 100% het hypo, \$175, outcrossed unrelated normals, \$125. **Wandering:** melanistics (outcrossed), \$95, Het melanistic (outcrossed), \$45. **Similis (Florida blue-striped)**, \$40. **Checkered:** granite checkered, \$100 (new recessive morph), 66% poss het (snow/granite) checkered, \$35. Scott, 919-413-8321; email: SFelzer1@nc.rr.com, website: www.albinogartersnake.com.

For sale: Trophy quality jungle carpet, diamond-jungle, and jaguar carpet pythons. Website: moreliapython.googlepages.com E-mail: junglejohn@tds.net

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, June 24, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. This will be our popular and always well-attended annual **Show & Tell** meeting. Bring an animal that you find interesting for one reason or another and be prepared to give a short (under five minutes) presentation to the group. Don't be shy. Age (yours) or commonness (the animal's) should not be a limitation. Guidelines for the occasion: don't bring venomous reptiles or endangered species, and please bring only amphibians or reptiles (this means no worms, tarantulas or other invertebrates).

Dr. Kate Jackson, Assistant Professor of Biology at Whitman College in Walla Walla, Washington, will speak at the July 29 meeting. Dr. Jackson is the author of *Mean and Lowly Things: Snakes, Science and Survival in the Congo*. Copies of her book will be available for sale (and signing) at the meeting.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

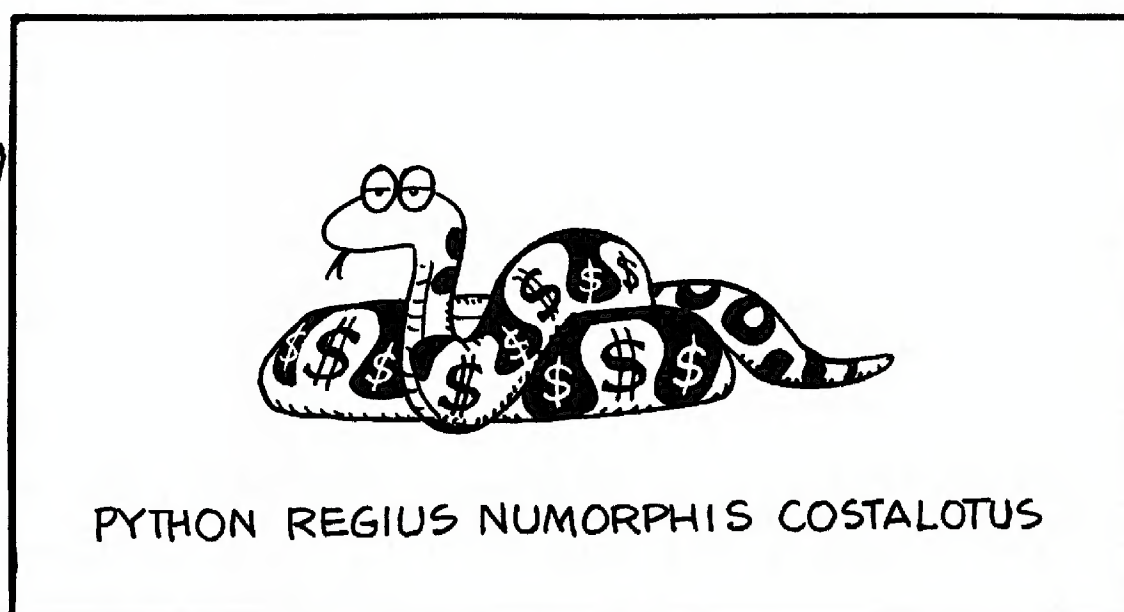
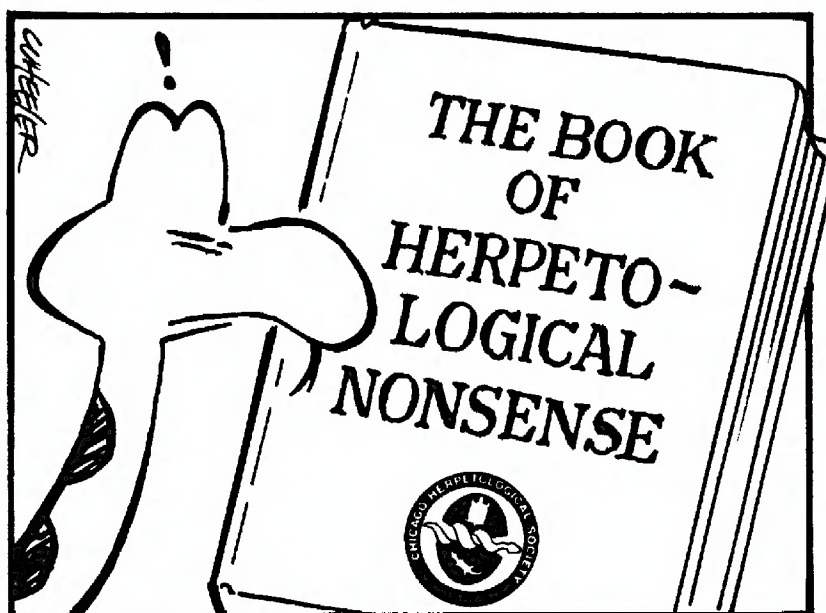
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., July 17, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: <http://www.geocities.com/~chicagoturtle>.

THE ADVENTURES OF SPOT



ReptileFest 2009

Over 5,000 people walked through the doors during the two days of ReptileFest 2009. Over 200 volunteers brought animals or just helped wherever they could to make the event a success. Each one of you deserves a personal thank-you for your efforts, but we can't write that many letters. This, as inadequate as it is, will have to serve. Your society thanks you for your time, your effort, and your enthusiasm. You have made it possible to continue the work that your society is doing in education and conservation of herps. We know that it was a lot of work. We're pretty sure it was a lot of fun. Get ready for the next one. Mark your calendars.

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